

Accumulation and Deposition of Fe by Acidophilic Eukaryotes and their Possible Role in the Formation of Fe-rich Deposits

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A fundamental objective broadly defined in astrobiology is the detection and recognition of biosignatures that can reveal and characterize past or present life in ancient samples from Earth as well as in extraterrestrial samples. If life ever existed, or still exists, on Mars or other planets, its record is likely to be found in minerals formed by, or in association with, microorganisms. Microbial communities are recognized for playing a potentially important role in modifying surface sediment characteristics. Thus, ecological research on extreme environments regarding interaction between microbes and minerals have been receiving an increasing attention during the last years. This study provides the first results we have obtained regarding the influence of eukaryotic microorganisms on the formation of iron-rich deposits in an extreme acidic environment, the Tinto River (SW Spain) considered as a possible analogue of Mars. The ability of eukaryotes to precipitate minerals in acidic extreme environments has rarely been documented and is generally attributed to prokaryotes. We document here the iron biomineralization behaviour of different acidophilic eukaryotes, such microalgae or amoeba, as well as the structure and composition of different biofilms related to the interaction microorganisms-mineral.